

Modular Load-Limiting Device for 3G MAR

Completed Technology Project (2017 - 2018)



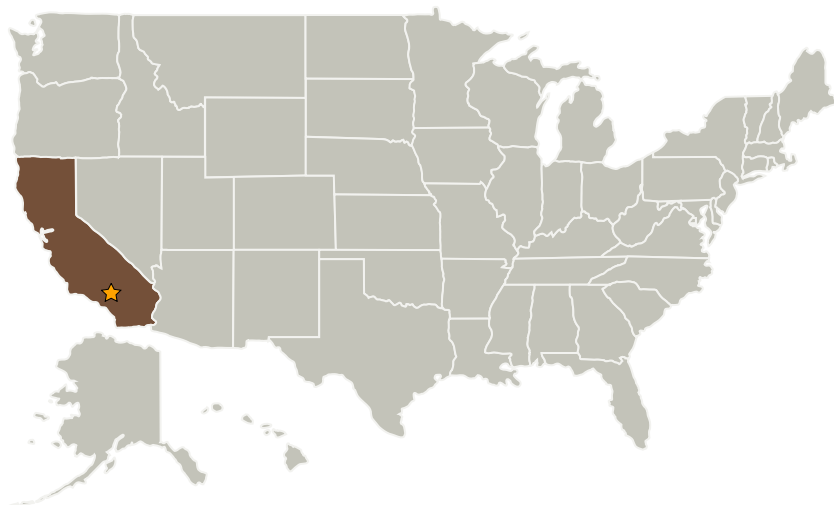
Project Introduction

Design, build, and test a textile LLD with extended stroke, capable of accommodating a wide range of MAR weights to tailor the load limiting capability. Create a cost efficient technique for the capability

Anticipated Benefits

The use of a textile-based LLD was demonstrated in flight for a mid-air capture of 1100 lbm. This demonstration occurred in 2016. The goal of this technology development was to demonstrate a textile-based LLD for a payload weight of 10,000 lbm, increasing the system capability 10-fold, thereby allowing for mid-air retrieval of very large space-returning hardware.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Armstrong Flight Research Center(AFRC)	Lead Organization	NASA Center	Edwards, California
Airborne Systems North America of CA, Inc.	Supporting Organization	Industry	



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Primary U.S. Work Locations

California

Project Transitions



October 2017: Project Start



September 2018: Closed out

Closeout Summary: Thirteen samples of varying configuration were successfully tested. Six of the 13 samples experienced webbing failure or damage on one or both legs of the bridle and did not function properly the entire stroke. The failures occurred on bridles using high strength thread and/or high-density stitching. The failure of the fill fibers allowed the webbing to ravel and lose structure. The combination of the superimposed seam and peel loading condition on the webbing creates higher stress on the fill fibers causing failures at significantly lower than rated loads.

Project Website:

https://www.nasa.gov/directorates/spacetech/innovation_fund/index.html#.VQ

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Armstrong Flight Research Center (AFRC)

Responsible Program:

Center Innovation Fund: AFRC CIF

Project Management

Program Director:

Michael R Lapointe

Program Manager:

David F Voracek

Principal Investigator:

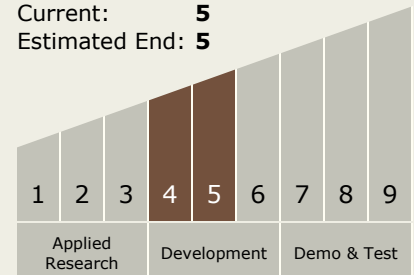
John Kelly

Technology Maturity (TRL)

Start: 4

Current: 5

Estimated End: 5



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Technology Areas

Primary:

- TX09 Entry, Descent, and Landing
 - └ TX09.3 Landing
 - └ TX09.3.1 Touchdown Systems

Target Destinations

Earth, Mars